

EDGE EVO®

Standard Networked Controller
EH400-K/ESH400-K

82000-921, Rev. D.3

EDGE EVO is the next evolution in access control hardware solutions. A true IP solution that meets the demands of open architecture, IP-centric environments, EDGE EVO provides fully distributed intelligence and decision making right to the door, leveraging the IT infrastructure to the maximum extent possible. Leveraging Power-over-Ethernet (PoE), EDGE EVO reduces door installation costs by not requiring a separate local power supply under many circumstances. The Standard Networked Controller is a fully integrated single-door controller offering discrete I/O and Wiegand/Clock-and-Data interfaces to readers. Additionally, connect native Hi-O™ devices (readers, locks, pushbuttons) and EDGE EVO Hi-O Modules to the Hi-O bus, providing secure communication around the door. Hi-O involves devices with built-in intelligence and a CANbus that links all the devices together. Password protect or encrypt Hi-O CANbus data traffic. Each Hi-O device (such as the push plate, electric strike, card reader and door operator) is connected to the CANbus by a single, four-wire cable. Two wires supply power and the other two are used for data communication.

Specifications

	CONDITIONS		VOLTAGE DC	CURRENT	POWER	OPERATING TEMPERATURE	CABLE LENGTH	REGULATORY REF NUMBER
INPUT	DC Input (NSC)		+12 VDC	0.18 Amp	2.16 W	32° - 122°F (0° - 50° C)	Hi-O CANbus Total Length: 100 ft (30 m) 22 AWG 0.65 mm 0.33 mm ² Maximum between drops: 30 ft (10 m) 22 AWG 0.65 mm 0.33 mm ² RJ-45 328 ft (100 m) Category 5 K	KE400CX ₂ N
			+24 VDC	0.14 Amp	3.36 W			
			PoE (+48 VDC NOM)	0.085 Amp	4.08 W			
	DC Input (MAX)		+12 VDC	1.50 Amp	18.00 W			
			+24 VDC		36.00 W			
			PoE (+48 VDC NOM)	0.30 Amp	14.40 W			
Supervised inputs (AC, Batt, REX, Door Mon) (MAX)		0-+5VDC Reference		0.005 Amp (sink)	0.025 W			
Data 1/CLK , Data 0 / Data (MAX)				N/A	N/A			
GRN LED, RED LED, Beep, Hold (MAX)				0.005 Amp (sink)	0.025 W			
External Tamper (MAX)		+5VDC (NOM)	0.02 Amp	0.100 W				
OUTPUT	CAN DC PWR Output (MAX)	AUX 12/24 VDC Input	+10.8 to +24 VDC	1.2 Amp*	28.80 W			
		PoE Input	+ 24 VDC (NOM)	0.4 Amp*	9.60 W			
	Reader DC PWR Output (MAX)	AUX 12 VDC		+9.8 to +12.25 VDC	0.32 Amp*	3.92 W		
		AUX 24 VDC			0.60 Amp*	7.35 W		
		PoE Input			0.58 Amp*	7.11 W		
	Strike***/ AUX Relays NC or NO DC Output (MAX)	AUX 12 VDC Input	Unregulated (Wet) Jumpers	+10 to +12 VDC		8.40 W		
			Regulated (Wet) Jumpers - 12 VDC	+23 to +24 VDC	0.70 Amp*	16.80 W		
		AUX 24 VDC Input	Unregulated (Wet) Jumpers	+10 to +12 VDC		8.40 W		
			Regulated (Wet) Jumpers - 12 VDC	+16.5 to +24 VDC	0.36 Amp*	8.64 W		
		PoE Input	Unregulated (Wet) Jumpers	+10 to +12 VDC	0.58 Amp*	6.96 W		
Regulated (Wet) Jumpers - 12 VDC			+12 to +24 VDC External	2.00 Amp**	48.00 W			

Legend

AUX = Auxillary input or output
CAN = CANbus
NSC = Normal Standby Condition

PoE = Power over Ethernet
NC = Normally Closed
NO = Normally Open

* Combined output ratings not to exceed V*1 = W:

- 1.2 Amp (+ 24 VDC Aux Input, 28.8 W)
- 1.2 Amp (+ 12 VDC Aux Input, 12.96 W)

** Each relay

***Shared between each relay

Regulatory Reference Number Deciphering

X₁ = K for Black
G for Gray
X₂ = N for non-Solo
S for Solo

This Installation Guide is for informational purposes only. HID makes no warranties, expressed or implied, in this summary. Company, product names and data used in sample output are fictitious. Specifications are subject to change without notice.

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Installation

1 Power Analysis

Before starting installation, determine which components will be used in the system and analyze the power requirements to avoid over-loading the EDGE EVO Hi-O Networked Controller & Reader (EH400-K).

The following steps illustrate sizing power requirements for the system.

Step 1 Identify System Components

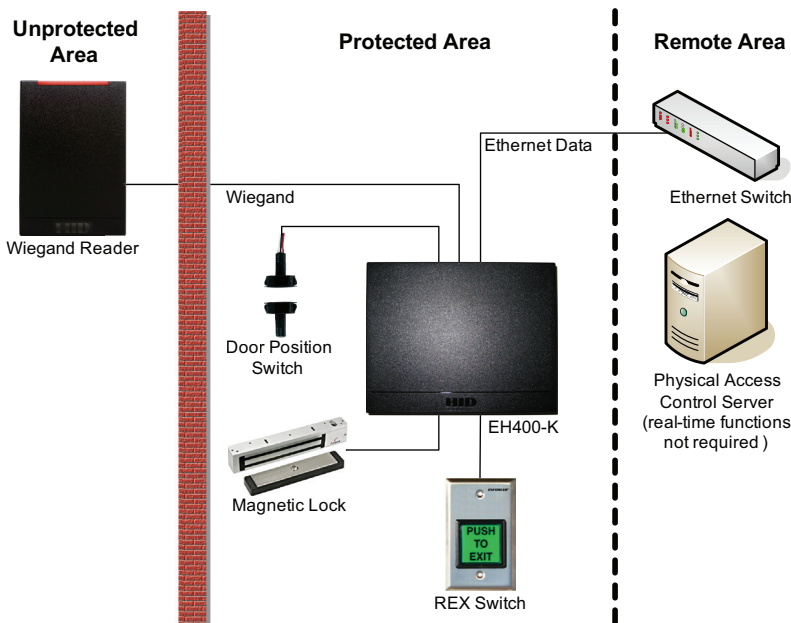
Identify the components that will be used in the system. A typical installation may include the following components:

- Door Position Switch - Detects when the door is open or closed.
- Magnetic Lock - Holds the door locked.
- Request to Exit (REX) Switch - Unlocks the door when exiting the secured area.
- EDGE EVO Hi-O Standard Networked Controller (EH400-K) - Provides access control and manages all peripherals around the door.
- iCLASS® Wiegand Reader - Provides entry into the secured area.

Step 2 Create System Layout

Using the components identified in *Step 1 Identify System Components* create the system layout.

In this example, the EH400-K is connected to the remote server through an Ethernet connection and manages door peripherals over the Hi-O bus. Controlling downstream door peripherals, the EH400-K is a fully integrated single-door controller offering discrete I/O and Wiegand/Clock-and-Data interfaces to external readers. The EH400-K receives inputs from the Door Position Switch and REX Switch to drive the Magnetic Lock output.



Step 3 Analyze Power Requirements

A - Door Peripheral Operational Currents

For the door peripherals identified in *Step 1 Identify System Components*, consult the vendor data sheets to determine the operational current draw. Typical operational current draw is provided below.

Note: See individual peripheral data sheets for actual operational current draw.

Device	Conditions	Typical Operational Current
Door Position Switch	V _{IN} = 12VDC	15mA
(For example, Securitron MSS)	V _{IN} = 24VDC	15mA
Mag Lock	V _{IN} = 12VDC	300mA
(For example, Securitron M32)	V _{IN} = 24VDC	150mA
REX Switch	V _{IN} = 12VDC	28mA
(For example, Securitron EEB)	V _{IN} = 24VDC	38mA
iCLASS Wiegand Reader	V _{IN} = 12VDC	150mA

B - Match I/O Requirements to the Hi-O Interface Device

For the door peripherals identified in *Step 1 Identify System Components*, the system requires direct connection to I/O interface and Wiegand/Clock-and-Data ports of the EH400-K. A separate Hi-O Interface Device is not required.

C - Compute and Compare Overall Current Draw

Calculate the total current draw for all door peripherals, all Hi-O interface devices, and all Hi-O enabled readers with the following equation, adding terms as required.

$$I_{total} = I_{dps} + I_{mag} + I_{rex} + \dots + I_{EDM-M}$$

For this example, the total current draw equals the following:

$$I_{total} @ +12VDC = 15mA + 300mA + 28mA + 150mA^* = 493mA$$

$$I_{total} @ +24VDC = 15mA + 150mA + 38mA + 150mA^* = 353mA$$

Compare the required current draw (I_{total}) to the output current capacity of the EH400-K to select the EH400-K power scheme. See *Specifications*. The CAN DC PWR Output represents the entire power output capacity of the EH400-K.

Device	Port	Conditions	V out	I out
Standard Networked Controller (EH400-K)	CAN DC PWR Output (MAX)	AUX +12/24 VDC Input	+10.8 to +24VDC	1.2 Amp
		PoE Input	+24VDC (NOM)	0.4 Amp

In this example, the EH400-K provides sufficient power when operated with a PoE injector or +12/24VDC auxiliary power supplies.

Directly connect the door peripherals identified in *Step 1 Identify System Components* to the EH400-K I/O ports per the *Specifications* for the selected input power scheme.

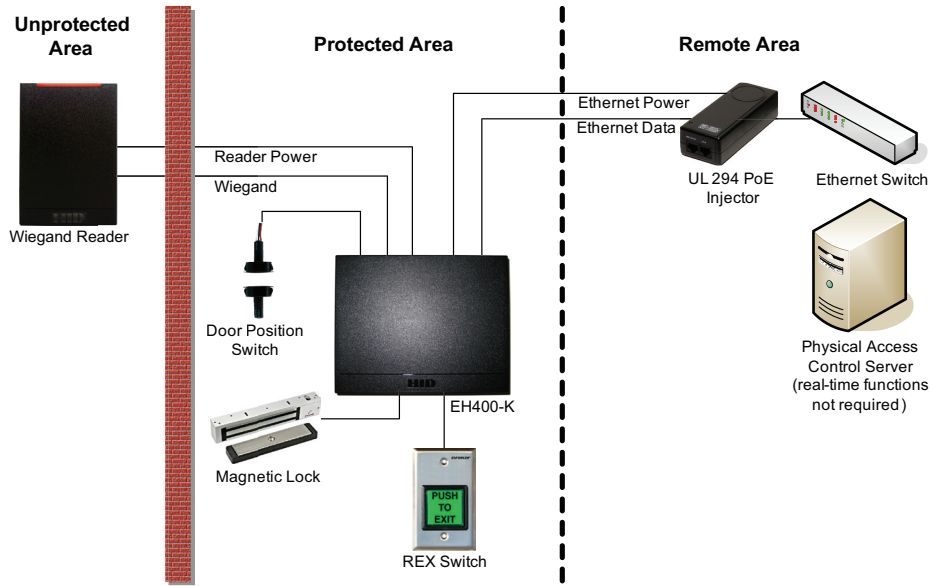
Ensure all door peripherals connected to the Strike/AUX relays or the Reader DC PWR Output, or both, do not exceed 1.2 Amps (AUX Input) or 0.4 Amps (PoE Input) combined. Alternatively, the door peripherals may be connected to the Strike/AUX relays configured for Dry contact up to 2 Amps per relay.

Step 4 Select Power Scheme

Select the appropriate power scheme to meet overall current draw. Using the analysis from the previous sections equates to the following two power scheme options.

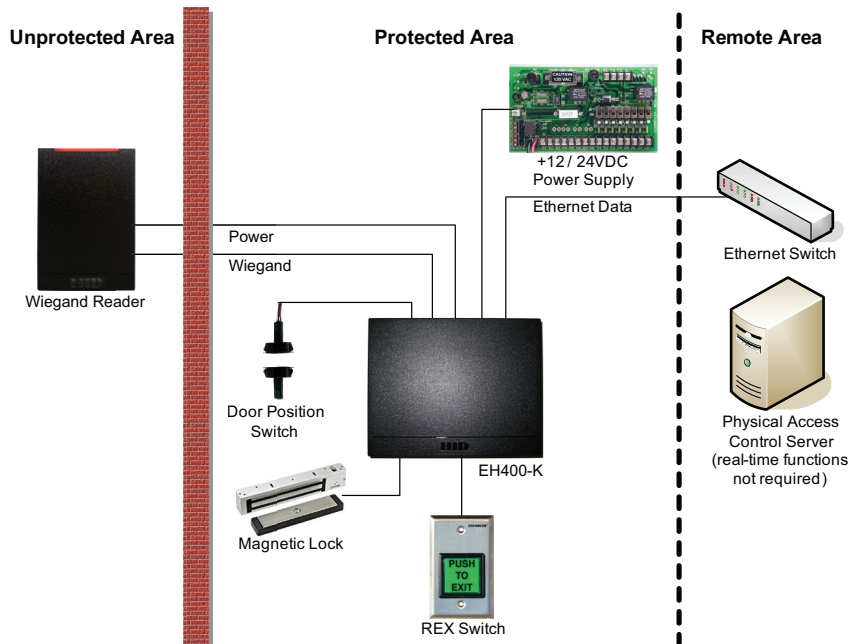
Power Scheme 1

Standard Networked Controller power is derived from PoE. Insert a UL294 Listed PoE Injector in the Ethernet line to power the Standard Networked Controller.

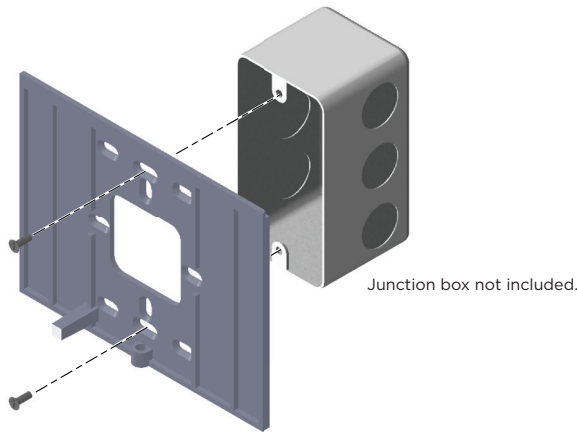


Power Scheme 2

Standard Networked Controller power derived from an external +12VDC or +24VDC power supply. Standard Networked Controller is connected directly to the Ethernet switch without a PoE Injector.

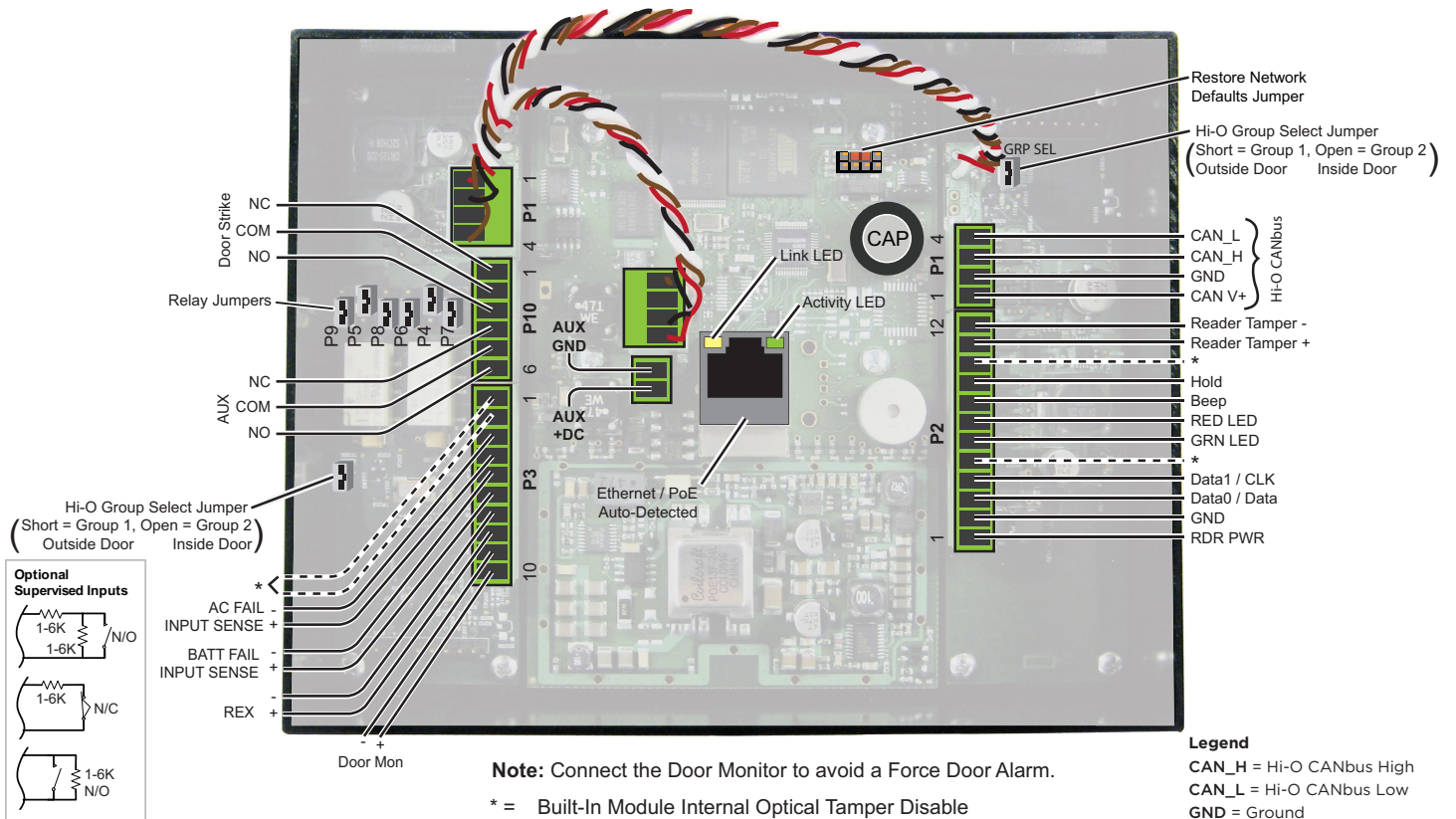


2 Mounting



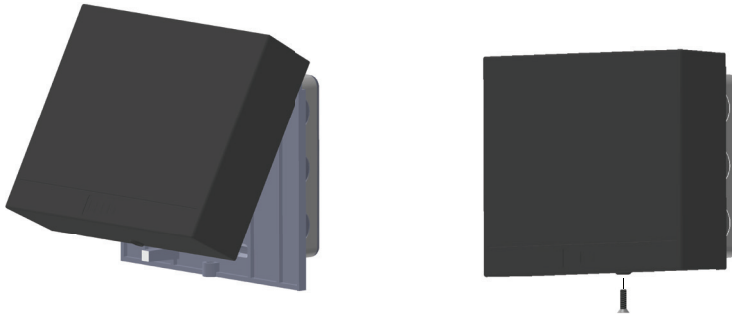
ATTENTION
Observe precautions for handling
ELECTROSTATIC SENSITIVE DEVICES

3 Wiring



CAUTION: Some magnetic locks exhibit both high inrush current when activated and a high instantaneous break voltage when de-energized due to magnetic field collapse. It is recommended you use of a snubber circuit across the controlling relay terminals to protect the controlling relay contacts. Go to www.hidglobal.com > Support and search for "Edge Solution 891" to access *How do I wire a High In-Rush Current locking device to VertX/EDGE EVO*. Not evaluated by UL.

4 Install to Backplate



Contact EDGE EVO with the information provided in the next section.

5 Contact

Contact EDGE EVO through one of the following methods:

Direct Connect

If connecting EDGE EVO to a network using static IP addressing or if the Discovery GUI is not installed on the PC, use this method.

Note: The computer must be running Windows 2000 or XP and be configured for DHCP.

1. Disconnect the computer from the network and directly connect EDGE EVO to the computer with an Ethernet cable.
2. Select **Start > Run** and enter **ipconfig /renew**.
3. Open a web browser and enter **169.254.242.121** into the **Address field**.

Discovery GUI (for DHCP Networks)

With a DHCP network, use the HID Discovery GUI on the PC to locate and connect the Controller.

Note: The Controller must be connected to the network before power is applied for DHCP to function. Java is required for the Discovery GUI.

1. With the PC connected to the same network as the Controller, double-click **hid-discovery.exe**.
Note: If the HID Discovery Application is not on the PC, download the application from www.hidglobal.com/drivers. Search for “Discovery” and the DISCOVERY GUI download window will appear.
2. Select the device from the list and click the **Launch Browser** button.

6 Configure

The web browser will prompt for login information.

Note: To correct errors in the controller Network Configuration or if the admin password is not available, see *Appendix B: Troubleshooting*.

1. From the **Login** screen enter **admin**, leaving the **Password** field empty.
2. Follow the instructions on the web browser screen to configure EDGE EVO.

Note: On subsequent sessions, the password may be changed by the user. The password must be between 6 to 10 characters long and can include all printable ASCII characters from 32 to 126 (decimal). Reference: <http://www.asciitable.com>.

For EDGE EVO Solo, see the *EDGE EVO Solo User Guide*, 83000-902, rev B.x.

7 Power & Testing

Test the system once per year using the web Graphical User Interface to ensure all wiring and configuration is correct.

For additional installation information, such as Passive Infrared Device (PIR) and other active REX devices, as well as connecting fire relays, see <http://www.hidglobal.com> > **Support** and search for "EDGE EVO."

Appendix A Hi-O Interface Modules

Hi-O interface modules are used to interface the EDGE EVO Networked Controller. Hi-O interface modules connect the native Hi-O bus with additional components around and behind doors and other access points.

For Hi-O interface module wiring, see their respective Installation Guides: go to www.hidglobal.com > **Support** > **Document Library** and search the document type **Installation Guide**.

Model	Description	Part Number
EDM-M	EDGE EVO Door Module	82342
EIM-M	EDGE EVO Input Module	82340
EWM-M	EDGE EVO Reader Module	82360
EDWM-M	EDGE EVO Door & Reader Module	82363AM
ELM	EDGE EVO Lock Module	82301
EVM	EDGE EVO Voltage Module	82365

Appendix B Troubleshooting

See *Section 3: Wiring* to clarify the procedures in this appendix.

B.1 Network Defaults Jumper Procedures

Use the applicable Network Defaults Jumper procedure to correct potential errors in an EDGE EVO and EDGE EVO Solo controller Network Configuration or if the admin password is not available.

EDGE EVO (EH400-K)

This Network Defaults Jumper procedure requires physical access to the EDGE EVO controller. Physical access provides the necessity to place a jumper over the debug port prior to the controller rebooting. The controller reconfigures the network settings to the factory defaults when the jumper is on the debug port during a reboot. From this point, configuration (or re-configuration) proceeds normally.

A jumper is supplied with the EDGE EVO for the Hi-O termination; borrow this jumper to perform this process. Replace the jumper to the Hi-O termination after restoring network defaults.

1. Remove the back plate on the EDGE EVO.
2. Loosen the Mylar cover.

Note: For the jumper location, see the diagram in *Section 3: Wiring*.

3. Reboot the controller and place the supplied jumper over pins 3 and 5 of the Debug port after the beep. The Debug port is an eight pin header, located above and to the right of the Ethernet connector, underneath the Mylar.

Note: The network reset opportunity occurs for 30 seconds, while rebooting the controller. On an EDGE EVO, a second beep occurs to signal the end of the 30 second period.

4. After 30 seconds, the beeper stays on constantly to indicate success. When an error occurs, you receive a single beep.
5. Remove the jumper; return it to the Hi-O termination header and cycle power. The controller resets in approximately 60-seconds. Once the reset is complete, you hear the single beep. After the 30-second window, you hear the second beep. The controller is fully functional during this time.

CAUTION: During the controller rebooting process, all network configuration information is overwritten and returned to the original defaults.

6. Configure the controller for your installation parameters.
7. Reinstall the back plate of the EDGE EVO.

EDGE EVO Solo (ESH400-K)

This procedure will reset the password for the admin user, the admin user can reset the user password if installer lock is enabled. This process requires:

- 5-10 minutes to complete.
- Contacting HID Global technical support by e-mail or phone with the unit's MAC Address to obtain the new generated password that is required in the following procedure.
- Physical access to the EDGE EVO Solo device.
- A pair of needle-nose pliers to work with a small jumper.

Note: This procedure works for all released versions of EDGE EVO Solo but must be followed very carefully for the process to work.

1. Remove the jumper from the HiO Termination pins. This is located to left of the HiO four-pin connector. This jumper will be used through the remainder of the procedure.
2. Power Cycle the EDGE EVO Solo unit.
3. Between 10 and 25 seconds after power is applied, place a jumper over pins 3 and 5 of the Debug Port (eight pin header located above and to the right of the Ethernet connector, underneath the Mylar - see graphic below). If no jumper is applied during this period the unit will continue to operate as normal and no reset will occur.

Note: If the jumper is applied before power is applied to the unit, no reset procedure is completed, and the unit will fail to boot correctly.

4. Provided the jumper is correctly fitted within the specified time, the unit will beep with 2 short beeps, then a pause. This beep/pause cycle will continue indefinitely until the jumper is removed.
5. Remove the jumper. The beeps will cease.
6. Wait a minimum of 1 second then reapply the jumper. The jumper must be reapplied within 15 seconds of removing it. If the jumper is not reapplied within this time, the device will emit 10 short beeps and the unit will automatically reboot. In this case the password will not have been reset.
7. The unit will beep with 2 short beeps, then a pause. This beep/pause cycle will repeat indefinitely until the jumper is removed.
8. Remove the jumper to complete the process.
9. The beeps will cease. The admin password is now reset to the value provided by HID Global Technical Support. The unit will beep quickly 10 times and then automatically reboot. The password reset process is now complete.
10. Reinstall the jumper borrowed from the HiO Termination pins. This is located to left of the HiO four-pin connector.
11. Connect to the unit via the JumpStart application, configured IP Address, or Alias IP Address.
12. The web browser will prompt for a username and password.
13. Login with username: admin and the password will be the 8-digit alphanumeric value you obtained from HID Global Technical Support.
14. It is recommend you immediately go and modify the password(s) using the **Password** option within the **Preferences** link.

B.2 Internal Optical Tamper

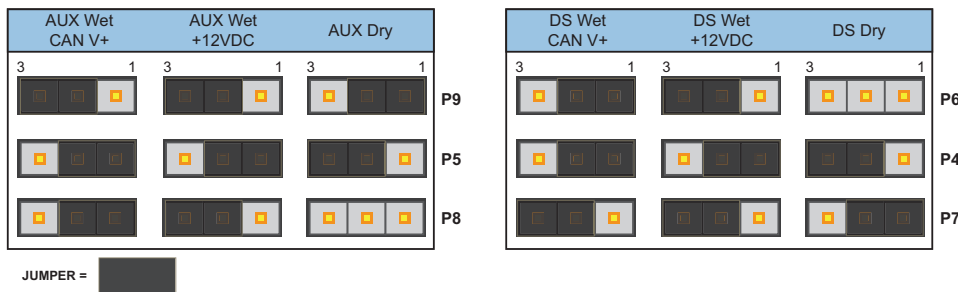
The Controller Optical Tamper can not be disabled. The Optical Tamper is suppressed by properly installing the back plate which contains a post with white paint on it and securing it to the unit. To disable the internal module optical tamper sensors:

- Right side of PCB (reader interface board): attach a jumper wire from P2 pin 10 to P2 pin 5.
- Left side PCB (door interface board): attach a jumper wire from P3 pin 1 to P3 pin 2.

CAUTION: The EH400-K ships from HID Global with these jumpers pre-installed on the connectors. Removing these jumpers causes false tampers to trigger.

Note: If desiring an external tamper, wire an unsupervised Normally Closed contact, replacing one of the pre-installed jumpers.

B.3 Relay Jumpers



B.4 Tamper (Reader Interface Board)

The Reader Tamper + and - are implemented allowing a connection for an open collector external tamper from a reader, such as iCLASS.

Note: Connect P2, Pin 2 (GND) from the Reader Interface Board to the same ground as the reader power if the reader is not powered by the unit's 12 VDC output port.

B.5 Door Interface Board Groups 1 and 2

Following are the inputs for Group 1 and Group 2 configurations.

Group 1			Group 2		
Input	Port	Pin	Input	Port	Pin
AC -	P3	Pin3	Input 4 -	P3	Pin3
AC +	P3	Pin 4	Input 4 +	P3	Pin 4
BATT -	P3	Pin 5	Input 3 -	P3	Pin 5
BATT +	P3	Pin 6	Input 3 +	P3	Pin 6
REX -	P3	Pin 7	Input 2 -	P3	Pin 7
REX +	P3	Pin 8	Input 2 +	P3	Pin 8
Door Mon -	P3	Pin 9	Input 1 -	P3	Pin 9
Door Mon +	P3	Pin 10	Input 1 +	P3	Pin 10

Regulatory

UL

Connect only to a Listed Access Control / Burglary power-limited power supply, or Listed Access Control / Burglary PoE (Power-over-Ethernet) adapter.

All National and local Electrical codes apply. Install in accordance with NFPA70 (NEC), Local Codes, and authorities having jurisdiction. Host-based security, Ethernet / Host Communication, has not been evaluated by UL. Ethernet port has been evaluated for supplemental use only.

Indoor use only.

The EDGE EVO family has been evaluated for standalone Access Control.

Mount onto UL Listed Single-Gang electrical box.

Hi-O Networked Controller and EDGE EVO Modules are UL Listed for installation within the protected area.

All panic and alarm hardware and equipment shall be UL Listed.

All cabling and wire shall be UL Listed or Recognized and suitable for the application.

All splices and connections shall be mechanically secure and bonded electrically.

EDGE EVO was evaluated for use with all Listed HID Global Wiegand models: iCLASS, Indala Prox, HID Prox, bioCLASS, SmartID, SmartTRANS, and Mag Stripe series (with and without keypad), up to 128-bit formats. EDGE EVO was evaluated for use with all HID Global Hi-O iCLASS readers.

Hi-O Networked Controller is UL Listed for installation in the unprotected area, as well as within the protected area.

CAUTION: Any changes or modifications to this device not explicitly approved by the manufacturer could void your authority to operate this equipment.

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canada Radio Certification

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CE MARKING

HID Global hereby declares that these proximity readers are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Por el presente, HID Global declara que estos lectores de proximidad cumplen con los requisitos esenciales y otras disposiciones relevantes de la Directiva 1999/5/EC.

HID Global déclare par la présente que ces lecteurs à proximité sont conformes aux exigences essentielles et aux autres stipulations pertinentes de la Directive 1999/5/CE.

A HID Global, por meio deste, declara que estes leitores de proximidade estão em conformidade com as exigências essenciais e outras condições da diretiva 1999/5/EC.

HID Global bestätigt hiermit, dass die Leser die wesentlichen Anforderungen und anderen relevanten Bestimmungen der Richtlinie 1999/5/EG erfüllen.

HID Global dichiara che i lettori di prossimità sono conformi ai requisiti essenziali e ad altre misure rilevanti come previsto dalla Direttiva europea 1999/5/EC.

Download copies of the R&TTE Declaration of Conformity (DoC) at <http://www.hidglobal.com/certifications>.

JAPAN MIC

この装置は認証済みです。

TAIWAN NCC

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

According to «Administrative Regulations on Low Power Radio Waves Radiated Devices» without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to an approved low power radio-frequency devices. The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved. The said legal communications means radio communications is operated in compliance with the Telecommunications Act.

The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org>).

HID Global

Patent Pending
Check reader label for current regulatory approvals.

Americas & Corporate

611 Center Ridge Drive
Austin, TX 78753
USA
Support: 866-607-7339
Fax: 949-732-2120

Asia Pacific

19/F 625 King's Road
North Point, Island East
Hong Kong
Support: 852-3160-9833
Fax: 852-3160-4809

Europe, Middle East & Africa

Haverhill Business Park Phoenix Road
Haverhill, Suffolk CB9 7AE
England
Support: 44 (0) 1440 711 822
Fax: 44 (0) 1440 714 840

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